

# MORS Workshop

## Analytic Support for Maritime Domain Awareness and Counter-Piracy

Working Group 4  
*-- MDA in National Waters --*

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# WG 4 Purpose

*To explore the issues of MDA specific to national waters and advance the analytic capability of MDA in these waters.*

# WG 4 Approach

- Four sessions devoted to:
  1. Means of defining MDA requirements, including those specific to national waters
  2. System-of-systems integration
  3. Metrics and analysis
  4. Strategy, resource allocation, and other emergent issues.
- Between 5 and 10 “leading questions” for each session aimed at focusing discussions toward the desired WG goals.



## WG 4 Approach (cont.)

- Early discussion on the meaning of “national waters”
  - Territorial (12 nm) vs. EEZ (200 nm) limit
  - Agreed that WG 4 scope includes EEZ.
- We did not attempt to define actual MDA requirements, but identified several factors that analysis and analytical methods should consider in the context of national waters.

# WG4 Findings

## MDA Requirements (1/3)

**Desired Outcome:** *Means of identifying MDA requirements necessary to answer operational needs, including those unique to national waters*

- Generic process for developing & coordinating reqmts
  - Start from a clear policy & governance structure
  - Identify stakeholders, their roles and responsibilities
  - Enable / facilitate stakeholder communication
  - Agree on a common 'language'
  - Allow for revision and validation of requirements
  - Get operators' input (not just a top-down approach)

# WG4 Findings

## MDA Requirements (2/3)

- What's different/unique to national waters?
  - Enforcement responsibilities
  - Must consider safety, security, and defence requirements
  - Density and mix of activities
    - recreational, commercial, etc.
    - wide range of behaviors
    - large # of vessels not reporting
    - challenges of geography
  - Higher risk due to likelihood & consequences of incidents (on population, environment, critical infrastructure, etc.)
  - Shorter response timelines
  - Large & varied information requirements from different stakeholders. Often exceed capacity (tradeoffs must be made).
  - Multiple levels of security and multiple legal authorities

} Higher  
"noise"

# WG4 Findings

## MDA Requirements (3/3)

- What 'effects' must be achieved or enabled by MDA?
  - Monitoring (detect, classify, identify, track, etc.)
    - Persistent in selected geographical areas
  - Discrimination (e.g. normal vs. abnormal activity)
  - Prediction
  - Deterrence of illegal/unwanted activities
  - Response & prosecution
  - Presence (virtual or real)
  - Safe & secure environment for marine activities and economic development
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# WG4 Findings

## System of Systems (1/3)

**Desired Outcome:** *Identification of current and new analytical models, tools, and techniques that can be used to integrate MDA across systems and operationalize MDA information.*

- How should requirements for national waters be integrated with those of other waters?
  - compatible & flexible solutions, protocols
  - seamless integration and cueing of assets
  - adequate knowledge management capability
  - harmonized standards

# WG4 Findings System of Systems (2/3)

- How should requirements for national waters be integrated multi-nationally?
  - Shared vision and principles
  - Harmonized formats and security standards
  - Shared lexicon
  - Influence between national and intl standards
  - Stakeholders and secondary users' requirements must be considered from the onset
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# WG4 Findings

## System of Systems (3/3)

- Key areas for analysis
  - Capability / requirement-driven assessments
  - Multi-source, multi-sensor ISR architecture analyses
  - Process models of info flow, including human aspects
  - Information reliability / quality assessments
  - Value-based decision-making and prioritization techniques
  - Analyses of risks involved in sharing too much or too little information (considering classification constraints)
  - Synchronization & queuing of assets, timeline analyses
  - C3 modeling tools and assessments
  - Networks (social, virtual, physical) analyses

# WG4 Findings

## Metrics & Analysis (1/3)

**Desired Outcome:** *Identification of relevant MDA measurement and analytic issues and development of strategies and methods for ensuring MDA information quality, timeliness, etc.*

- (Some) MDA measures of effectiveness requiring particular attention
  - Overall C2 (including quality and timeliness of decisions taken)
  - Data quality and reliability (incl. false positives / negatives)
  - Knowledge / understanding of environment
  - Depth and value of information relative to mission
  - Effectiveness of persistent coverage

# WG4 Findings Metrics & Analysis (2/3)

- How to deal with multiple MOEs?
  - Prioritization methods (based on analysis or aligned with Commander's intent)
  - Better visualization methods
  - MOEs feeding a higher-level risk framework
- What are the appropriate measures of risk?
  - "All risks" approaches needed
  - Quantifiable in the safety & security realm; qualitative risk assessments for rare events
  - Relative measures often more appropriate than absolute measures
  - Risk reduction to cost (all resource) ratio
- How to deal with uncertainty and errors?
  - Standard ways of calculating / presenting uncertainties
  - Better understanding of expert-judgment techniques and their accuracy

# WG4 Findings Metrics & Analysis (3/3)

- Topics / questions requiring analysis
  - What is the right mix/balance of sensors in national waters?
  - How much MDA is “good enough”?
  - What quality of information is needed by players?
  - Cost-benefit analysis methodologies (including resources and logistics)
  - Optimization and task prioritization for ISR plans (including inter-agency coordination of assets)
  - Mission requirements & CONOPs
  - Experimentation, acquisition
  - Level of automation required and decision support tools? (anomaly detection)
  - Improved M&S toolkit (forecasting, normalcy, networks, vulnerability)
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# WG4 Findings

## Strategy, Resource Allocation & Emerging Issues (1/4)

- Desired Outcomes:** *-Strategic priorities for the analysis, operations and policy communities.*
- Analytical approaches to strategy and resource allocation efforts.*
- Future issues that will require additional MDA analytic thinking*
- How can analysis support MDA resource allocation/procurement differ within different time horizons?
    - Need to be able to make comparisons and measure success/risk/effectiveness over time
    - Requires flexible tools and good understanding of uncertainties
    - Requires analysis of the impact of various changes to the EEZ (from climate change, territorial claims, geopolitical changes)
    - Must be able to identify overlap and wasted resources

# WG4 Findings

## Strategy, Resource Allocation & Emerging Issues (2/4)

- How can we task, schedule and coordinate MDA assets from different nations or agencies?
  - Still a need for coordination/scheduling models;
  - Methods must enable WoG and Intl collaborations, and take into account privacy issues
  - Operators must be involved to produce realistic output
  - Must investigate how to leverage the knowledge of local communities (e.g. through network analysis)

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# WG4 Findings

## Strategy, Resource Allocation & Emerging Issues (3/4)

- What are the MDA-specific analytic competencies that need development?
  - Analysts require an open mind and an ability to deal with a very complex environment
  - No specialized competencies required, but access to these competencies is needed
  - Wide range of training must be available
  - Basic understanding of legal & authority issues associated with security in national waters and info sharing

# WG4 Findings

## Strategy, Resource Allocation & Emerging Issues (4/4)

- How can communications and productivity be improved within the MDA analytic community?
  - Better awareness of MDA analytic community first required (OGDs, Industry)
  - Portals (repositories for data, tools and expertise)
  - Standards (data and measures)
  - Users' groups
- What issues may emerge to impact current MDA thinking?
  - Changes to what we mean by national waters
  - Fleet structure analyses (e.g. multi-departmental crewing and tasking)
  - Logistic issues

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# WG X Findings

Output 2: What types of analysis and what tools/models are required to help the operational community answer the operational questions regarding MDA, and do they currently exist?

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# WG X Findings

Output 3: What skill sets, agency representation, etc. should be part of an MDA analysis community? What type of forum is suitable to ensure that proposed initiatives to build an MDA analysis community do not fail?

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# WG4 Findings

## MDA Requirements (1/4)

**Desired Outcome:** *Identification of the MDA requirements necessary to answer operational needs, including those unique to national waters*

### Leading Questions:

- What are the **unique requirements for MDA in national waters**? How should analysis consider factors specific to national waters, such as geography, environment (e.g. Arctic), shipping density, proximity to ports and urban areas, interagency / intergovernmental tasking of assets and information sharing, legal constraints on intelligence collection.
- What are the **desired “effects” of MDA** in national waters?
- What is the **best process for developing, coordinating and communicating** these requirements?
- How can MDA requirements be developed by considering **other types of requirements** in national waters (e.g. presence, response) and international waters?
- How should MDA requirements be **captured, categorized and prioritized**?



# WG X Recommendations

- Recommendation 1:
- Recommendation 2:
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# Immediate Opportunities/Actions



# Longer-term Opportunities/Actions



# WG X Summary

- Give a few statements that wrap up and provide the gist of WG deliberations, findings, and recommendations at a high level

# WG4 Findings

## Metrics & Analysis (2/3)

- How to deal with multiple MOEs?
  - Prioritization methods (based on analysis or aligned with Commander's intent)
  - Better visualization methods
  - MOEs feeding a higher-level risk framework
- What are the appropriate measures of risk?
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